

war was 45 per cent greater than the combined French and British rate.

The American production of high explosives — T.N.T., ammonium nitrate, picric acid, and others—was not established, when we declared war, on so large a scale as that of smokeless powder. It was necessary, therefore, to erect new plants. This need, by the way, was the main reason for the restrictions on the sale of platinum, which is necessary at one point in the process of manufacture. As a result of the efforts that were made, our established rate of production of high explosives at the close of the war was over 40 per cent larger than Great Britain's, and nearly double that of France. The averages for August, September, and October for the three countries were:

Great Britain	30,957,000
France	22,802,000
United States	43,888,000

The result of the high rate of production of both smokeless powder and high explosives was that the artillery ammunition program was never held up for lack of either the powder which hurls the bullet or shell from the gun or the high explosive which makes the shell effective when it reaches its destination.

TOXIC GASES

When the clouds of chlorine suddenly enveloped the British and French lines in the Ypres salient, early in 1915, a new weapon was introduced into the war. That it was a powerful weapon is evidenced by the fact that during the year 1918 from 20 to 30 per cent of all our battle casualties were due to gas.

At the time we entered the war we had had practically no experience in manufacturing toxic gases, and no existing facilities which could be readily converted to such use. At the signing of the armistice, we were equipped to produce gas at a more rapid rate than France, England, or Germany.

In the early days of our participation in the war it was hoped that concerns engaged in chemical manufacture could be put into this new field. There were many valid objections,